

REMARKS

In summary, claims 1-19 are pending. Claims 2, 3, 10-12, and 17-19 stand rejected under 35 U.S.C. §112. Claims 1-19 stand rejected under 35 U.S.C. §101. Claims 1, 4, and 13-16 stand rejected under 35 U.S.C. §102. Claims 5-9 stand rejected under 35 U.S.C. §103. Applicants respectfully traverse all rejections. Claim 16 is amended. No new matter is added.

Claim Rejections - 35 U.S.C. §112

Claims 2, 3, 10-12, and 17-19 are rejected under 35 U.S.C. §112, second paragraph as being indefinite because, as asserted, is it not clear how to compute V_k , S , and U_k^T based on the parameter k .

Applicant respectfully submits that V_k , S , and U_k^T are not indefinite because, when read in light of the specification, would be understood by those skilled in the art. Per MPEP § 2173.02, “[t]he test for definiteness under 35 U.S.C. 112, second paragraph is whether ‘those skilled in the art would understand what is claimed when the claim is read in light of the specification.’” As further taught in MPEP § 2173.02, if one skilled in the art is able to ascertain the meaning of the terms V_k , S , and U_k^T in light of the specification, 35 U.S.C. 112, second paragraph is satisfied. The terms V_k , S , and U_k^T are supported and described throughout Applications application. For example, see paragraphs [0005] through [0009] and [0043] through [0048].

Because one skilled in the art would be able to ascertain the meaning of the terms V_k , S , and U_k^T in light of the specification, it is requested that the rejection, under 35 U.S.C. §112, of claims 2, 3, 10-12, and 17-19 be reconsidered and withdrawn.

Claim Rejections - 35 U.S.C. §101

Claims 1-19 are rejected under 35 U.S.C. § 101. Claims 1-3 and 13-15 are characterized as being not limited to tangible embodiments and constituting solely software per se without any practical application. Claims 4-12 are characterized as merely reciting a

number of computing steps without producing any tangible result and/or being limited to a practical application, and appearing to constitute solely an abstract idea. Claims 16-19 are characterized as being not limited to tangible embodiments.

The test to determine if subject matter is statutory under 35 U.S.C. §101 is not whether the subject matter is tangibly embodied, but whether the claimed invention as a whole produces a useful, concrete and tangible result. This test is supported by MPEP § 2106 (II)(A). The portion of MPEP 2106 (II)(A) showing that statutory subject matter under 35 U.S.C. §101 must produce a useful, concrete and tangible result is provided below with emphasis added (in bold).

The claimed invention as a whole must accomplish a practical application. That is, it must produce a “**useful, concrete and tangible result.**” *State Street*, 149 F.3d at 1373, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of “real world” value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (*Brenner v. Manson*, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96); *In re Ziegler*, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)). Accordingly, a complete disclosure should contain some indication of the practical application for the claimed invention, i.e., why the applicant believes the claimed invention is **useful**.

Apart from the utility requirement of 35 U.S.C. 101, **usefulness** under the patent eligibility standard requires significant functionality to be present to satisfy the **useful result** aspect of the practical application requirement. See *Arrhythmia*, 958 F.2d at 1057, 22 USPQ2d at 1036. Merely claiming nonfunctional descriptive material stored in a computer-readable medium does not make the invention eligible for patenting. For example, a claim directed to a word processing file stored on a disk may satisfy the utility requirement of 35 U.S.C. 101 since the information stored may have some “real world” value. However, the mere fact that the claim may satisfy the utility requirement of 35 U.S.C. 101 does not mean that a **useful result** is achieved under the practical application requirement. **The claimed invention as a whole must produce a “useful, concrete and tangible” result** to have a practical application.

As evident from the above portion of the MPEP, qualifying statutory subject matter under 35 U.S.C. §101 is not required to be tangibly embodied. Rather, the claimed invention

as a whole must produce a useful, concrete and tangible result. To better understand the qualification of subject matter under 35 U.S.C. § 101, a brief development of the law is provided below.

35 U.S.C. § 101 reads:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The Supreme Court has construed § 101 broadly, noting that Congress intended statutory subject matter to “include anything under the sun that is made by man.” *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (quoting S. Rep. No. 82-1979, at 5 (1952); H.R. Rep. No. 82-1923, at 6 (1952)).

Despite the apparently infinitely broad sweep of 35 U.S.C. § 101, the Supreme Court has held that certain categories of subject matter are not entitled to patent protection. In *Diamond v. Diehr*, 450 U.S. 175, 185 (1981), the Supreme Court explained that there are three categories of subject matter for which one may not obtain patent protection, namely “laws of nature, natural phenomena, and abstract ideas.”

The Supreme Court has also held that certain mathematical subject matter is not, standing alone, entitled to patent protection. *Diehr*, 450 U.S. 175 (1981); *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v. Benson*, 409 U.S. 63, n.19 (1972). In *Diehr*, the Court explained that certain types of mathematical subject matter, standing alone, represent nothing more than abstract ideas until reduced to some type of practical application, *i.e.*, “a useful, concrete and tangible result.” *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994).

A close analysis of *Diehr*, *Flook*, and *Benson* reveals that the Supreme Court never intended to create an overly broad, fourth category of subject matter excluded from § 101. Rather, at the core of the Court’s analysis in each of these cases lies an attempt by the Court to explain a rather straightforward concept, namely, that certain types of mathematical subject matter, standing alone, represent nothing more than abstract ideas until reduced to some type

of practical application, and thus that subject matter is not, in and of itself, entitled to patent protection. *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994).

Because § 101 includes processes as a category of patentable subject matter, the judicially-defined proscription against patenting of a “mathematical algorithm,” to the extent such a proscription still exists, is *narrowly limited* to mathematical algorithms in the abstract. *State Street v. Signature Fin. Group Inc.*, 149 F.3d 1368, 1374-75 (Fed. Cir. 1998) (emphasis added).

The *Alappat* inquiry simply requires an examination of the contested claims to see if the claimed subject matter as a whole is a disembodied mathematical concept representing nothing more than a “law of nature” or an “abstract idea,” or if the mathematical concept has been reduced to some practical application rendering it “useful.” *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994). The claimed invention as a whole must accomplish a practical application. That is, it must produce a “useful, concrete and tangible result.” *State Street*, 149 F.3d 1368 at 1373.

To distinguish an abstract concept (*i.e.*, a pure mathematical algorithm) from a statutory subject matter, courts often determine if the claim would wholly preempt others from using the algorithm. For example, in *In re Iwahashi*, 888 F.2d 1370, 1375 (Fed. Cir. 1989), the court stated that the fact that four claimed means elements function to transform one set of data to another through what may be viewed as a series of mathematical calculations does not alone justify a holding that the claim as a whole is directed to nonstatutory subject matter. However, in *Gottschalk v. Benson*, 409 U.S. 63, 68-72 (1972), the Court noted that the claims for converting binary coded decimal numbers to pure binary numbers, as written, were “so abstract and sweeping” that they would “wholly pre-empt” the use of the mathematical formula.

The Supreme Court has supported and enhanced this effort. In *Diehr*, the Court explicitly distinguished Diehr’s process by pointing out that “the respondents here do not seek to patent a mathematical formula. Instead, they seek patent protection for a process of curing synthetic rubber.” *Diehr*, 450 U.S. at 187. The Court then explained that although the

process used a well-known mathematical equation, the applicants did not “pre-empt the use of that equation.” *Id.* Thus, even though a mathematical algorithm is not patentable in isolation, a process that applies an equation to a new and useful end “is at the very least not barred at the threshold by § 101.” *Id.* at 188.

A numerical result (*i.e.*, a numerical result representing information) may be a useful, concrete, and tangible result. It is important to note that whether the product of the claimed process is numerical is not a criterion of whether the claim is directed to statutory subject matter. *Arrhythmia Research Tech. Inc. v. Corazonix Corp.*, 958 F.2d 1053, 1060 (Fed. Cir. 1992).

In *AT&T Corp. v. Excel Communications Inc.*, 172 F.3d 1352, 1358 (Fed. Cir. 1999), a primary interexchange carrier (PIC) indicator value was derived using a simple mathematical (Boolean) principle. The PIC indicator *represented* information about the call recipient's PIC, a useful, non-abstract result that facilitates differential billing of long-distance calls made by an interexchange subscriber. *Id.* (emphasis added) The court noted that because the claimed process applies the Boolean principle to produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle, on its face the claimed process comfortably falls within the scope of § 101. *Id.*

Diehr also demands that the focus in any statutory subject matter analysis be on the claim as a whole. Indeed, the Supreme Court stated in *Diehr*: When a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect, then the claim satisfies the requirements of § 101. *Diehr*, 450 U.S. at 187.

A “process” no longer requires a physical transformation of something to a different state or thing: transformation of data is sufficient if it produces “a useful, concrete and tangible result.” This reasoning appears intended to be *broadly construed*. *Ex parte Donner*, 53 USPQ2d at 1702 (Board of Patent Appeals and Interferences, 1999) (emphasis added). A “physical transformation” is not an invariable requirement, but merely one example of how a

mathematical algorithm may bring about a useful application. *AT&T Corp.*, 172 F.3d at 1358.

As a specific example, in *State Street*, the court held that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces “a useful, concrete and tangible result”—a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades. *State Street*, 149 F.3d at 1375.

Office personnel have the burden to establish a *prima facie* case that the claimed invention as a whole is directed to solely an abstract idea or to manipulation of abstract ideas or does not produce a useful result. Only when the claim is devoid of any limitation to a practical application in the technological arts should it be rejected under 35 U.S.C. § 101. *Manual of Patent Examining Procedure* § 2106, Ed. 8, Rev. 2 (May. 2004).

Applicant’s claimed invention provides personalized grading of web pages or other interconnected objects. Personalized grading can result in quicker response times and more efficient queries. These results are useful, concrete, tangible, and a practical application in the technological arts.

With regard to claims 1-3 and 13-15, contrary to Examiner’s assertions, claims 1-3 and 13-15 are directed to a tangible embodied. Claims 1-3 and 13-15 are directed to a system. The system of claims 1-3 comprises a database and a page-grading engine, and the system of claims 13-15 comprises a page-grading engine. Thus, along with providing a useful, concrete, tangible result, claims are directed to a tangibly embodiment.

With regard to claims 4-12, claims 4-12 are directed to a method for grading objects. Claims 4-12 provide a useful, concrete, tangible result having a practical application in the technological arts: grading objects from an interconnected collection of weighted objects.

With regard to claims 16-19, claims 16-19 are directed to a computer-readable medium. Amended claim 16 is directed to a tangible embodiment. Claim 16 is amended to recite, in part, “a computer-readable storage medium.”

Because claims 1-3 and 13-19 are directed to a tangible embodiment, because claims 1-19 provide a useful, concrete, tangible result having a practical application in the technological arts, and because claim 16 is directed to a computer-readable storage medium, it is requested that the rejection, under 35 U.S.C. § 101, be reconsidered and withdrawn.

Claim Rejections - 35 U.S.C. §102

Claims 1, 4, and 13-16 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Publication No. 2005/0033742 in the name of Kamvar *et al.* (hereinafter referred to as “Kamvar *et al.*”).

Kamvar *et al.* neither discloses nor suggests several claim limitations. For example, Kamvar *et al.* neither discloses nor suggests “a page-grading engine associated with an approximation matrix Q' ,” an approximation matrix Q' , where Q' approximates an ideal matrix Q with respect to the connectivity information,” a personalization description v describing a set of preferences among the web pages,” “the page-grading engine ... grades search results with respect to Q' and v ,” and “the page-grading engine receives as input a personalization description v ,” as recited in claim 1.

Kamvar *et al.* teaches a method for ranking nodes in large directed graphs. (Abstract). Kamvar *et al.* nowhere mentions a page-grading engine. Kamvar *et al.* teaches that a “block link matrix B represents the link structure of the reduced graph.” (Paragraph 0025). The matrix B taught in Kamvar *et al.* is not “an approximation matrix Q' , where Q' approximates an ideal matrix Q with respect to the connectivity information.” In the instant Office Action, it is asserted that “ranks are good approximation to the actual ranks” to support the argument that Kamvar *et al.* discloses “an approximation matrix Q' . ” This statement is not understood. Moreover, Kamvar *et al.* nowhere discloses or suggests “a personalization description v

describing a set of preferences among the web pages” or grading “search results with respect to Q' and v .”

Accordingly, it is requested that the rejection, under 35 U.S.C. § 102, of claims 1, 4, and 13-16 be reconsidered and withdrawn.

Claim Rejections - 35 U.S.C. §103

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kamvar *et al.* in view of an article entitled “Fast Computation of Low Rank Matrix Approximations” authored by Dimitris Achlioptis and Frank McSherry (hereinafter referred to as “Achlioptis *et al.*”). Combing Achlioptis *et al.* with Kamvar *et al.* does not overcome the deficiencies of Kamvar *et al.* Accordingly, it is requested that the rejection, under 35 U.S.C. § 103, of claim 5 be reconsidered and withdrawn.

Claims 6-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kamvar *et al.* and Achlioptis in view of U.S. Patent No. 6,285,999, issued to Page (hereinafter referred to as “Page”). Combining Page with Achlioptis *et al.* and Kamvar *et al.* does not overcome the deficiencies of Kamvar *et al.* Accordingly, it is requested that the rejection, under 35 U.S.C. § 103, of claims 6-9 be reconsidered and withdrawn.

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PATENT

CONCLUSION

It is requested that the forgoing arguments, remarks, and amendments be entered, and in view thereof, it is respectfully submitted that this application is in condition for allowance. Reconsideration of this application and an early Notice of Allowance are respectfully requested. In the event that the Examiner cannot allow this application for any reason, the Examiner is encouraged.

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